PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-104130
(43)Date of publication of application : 10.04.2002

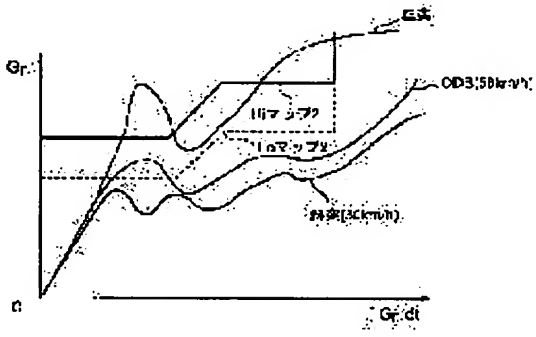
(51)Int.CI. B60R 21/32
B60R 21/01
G01P 15/00

(21)Application number : 2000-302645
(22)Date of filing : 02.10.2000

(71)Applicant : TOYOTA MOTOR CORP
(72)Inventor : MIYATA YUJIRO
NAGAO TOMOKI
IMAI KATSUJI
IYODA NORIBUMI

(54) STARTING CONTROL DEVICE FOR OCCUPANT CRASH PROTECTION DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To properly vary a starting output of an occupant crash protection device, regarding a starting control device for the occupant crash protection device.
SOLUTION: Satellite sensors 16 and 18 and a floor sensor 14 are provided on left and right sides of a front part of a vehicle body and a vehicle body center part, respectively. When a value fixed from a relation of speed reduction GF based on an output signal of the floor sensor 14 and speed ∫ GF.dt obtained by time-integrating the speed reduction exceeds a threshold value change pattern for output, a starting output is made a high output when an air bag device 30 is started. When either one of values fixed from a relation of speed reduction based on output signals of the satellite sensors 16 and 18 and the speed ∫ GF.dt exceeds a threshold value of an OR map, the threshold value change pattern for output is changed from a normal Hi map 2 to a Lo map 2 with a small threshold value.



LEGAL STATUS

[Date of request for examination]	21.03.2001
[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	3487279
[Date of registration]	31.10.2003
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The 1st sensor which outputs the signal according to the magnitude of the impact which is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection, is arranged in the predetermined location in a car body, and joins a car, When the parameter based on the output signal of said 1st sensor reaches a predetermined threshold The starting output-control means which makes high the starting output of said occupant crash protection as compared with the case where the parameter based on the output signal of said 1st sensor does not reach said predetermined threshold, The 2nd sensor which outputs the signal according to the magnitude of the impact which is ahead arranged rather than said 1st sensor in a car body, and joins a car, The starting control unit of the occupant crash protection characterized by having a threshold modification means to change said predetermined threshold according to whether the parameter based on the output signal of said 2nd sensor reached the predetermined value.
[Claim 2] It is the starting control unit of the occupant crash protection characterized by the parameter based on the output signal of said 2nd sensor changing said predetermined threshold into a small value as compared with the case where said predetermined value is not reached when the parameter on the starting control unit of occupant crash protection according to claim 1 and based on the output signal of said 2nd sensor in said threshold modification means reaches said predetermined value.
[Claim 3] The 1st sensor which outputs the signal according to the magnitude of the impact which is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection, is arranged in the predetermined location in a car body, and joins a car, When the parameter based on the output signal of said 1st sensor does not reach the 1st threshold, the starting output of said occupant crash protection is made low. Moreover, the starting output-control means which makes high the starting output of said occupant crash protection when the parameter based on the output signal of said 1st sensor reaches the 2nd large threshold as compared with said 1st threshold, It is ahead arranged rather than said 1st sensor in a car body, and has the 2nd sensor which outputs the signal according to the magnitude of the impact which joins a car. Said starting output-control means In the bottom of the situation of the parameter based on the output signal of said 1st sensor having reached said 1st threshold, and having not reached said 2nd threshold The starting control unit of the occupant crash protection characterized by changing the starting output of said occupant crash protection according to whether the parameter based on the output signal of said 2nd sensor reached the predetermined value.
[Claim 4] The 1st sensor which outputs the signal according to the magnitude of the impact which is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection, is arranged in the predetermined location in a car body, and joins a car, When the 1st parameter based on the output signal of said 1st sensor reaches a predetermined threshold The starting output-control means which makes high the starting output of said occupant crash protection as compared with the case where said 1st parameter does not reach said predetermined threshold, The 2nd sensor which outputs the signal according to the magnitude of the impact which is ahead arranged rather than said 1st sensor in a car body, and joins a car, The stage when said impact based on the output signal of said 2nd sensor reaches a predetermined reference value, The starting control unit of the occupant crash protection characterized by equipping the 2nd parameter based on the output signal of said 1st sensor with a threshold modification means to change said predetermined threshold according to relation with the stage to reach a predetermined value.
[Claim 5] In the starting control unit of occupant crash protection according to claim 4 said threshold modification means When said impact based on the output signal of said 2nd sensor reaches said

predetermined reference value and the 2nd parameter based on the output signal of said 1st sensor has not reached said predetermined value The starting control unit of the occupant crash protection characterized by changing said predetermined threshold into a small value as compared with the case where said 2nd parameter has reached said predetermined value.

[Claim 6] The 1st sensor which outputs the signal according to the magnitude of the impact which is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection, is arranged in the predetermined location in a car body, and joins a car, When the 1st parameter based on the output signal of said 1st sensor does not reach the 1st threshold, the starting output of said occupant crash protection is made low. Moreover, the starting output-control means which makes high the starting output of said occupant crash protection when the 1st parameter based on the output signal of said 1st sensor reaches the 2nd large threshold as compared with said 1st threshold, It is ahead arranged rather than said 1st sensor in a car body, and has the 2nd sensor which outputs the signal according to the magnitude of the impact which joins a car. Said starting output-control means In the bottom of the situation of the 1st parameter based on the output signal of said 1st sensor having reached said 1st threshold, and having not reached said 2nd threshold The starting control unit of the occupant crash protection characterized by changing the starting output of said occupant crash protection according to the relation between the stage when said impact based on the output signal of said 2nd sensor reaches a predetermined reference value, and the stage when the 2nd parameter based on the output signal of said 1st sensor reaches a predetermined value.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the starting control unit of occupant crash protection, and when changing the occupant crash protection for crew protection and starting the magnitude of an output especially at the time of a car collision, it relates to the starting control unit of suitable occupant crash protection.
[0002]
[Description of the Prior Art] The equipment started while changing air bag equipment suitably by high power and low-power output conventionally so that it may be indicated by for example, the patent number No. 2877145 official report is known. This equipment detects the deceleration which joins a car cross direction using the floor sensor arranged in the floor tunnel of a car-body center section, and calculates a predetermined operation value based on that detected deceleration. And the output of air bag equipment is changed by high power and low-power output by comparing the operation value with the threshold set up beforehand. For this reason, according to the above-mentioned conventional equipment, it becomes possible to start air bag equipment so that crew may be effectively taken care of to the impact which joins a car.
[0003]
[Problem(s) to be Solved by the Invention] However, the thresholds for changing the starting output of air bag equipment by high power and low-power output differ in the time of right ** and an irregular collision. When the above-mentioned threshold is set as the single value in the above-mentioned conventional equipment, it becomes impossible for this reason, to control the starting output of air bag equipment proper according to the collision gestalt of a car.
[0004] This invention is made in view of an above-mentioned point, and aims at offering the starting control unit of the occupant crash protection which can carry out adjustable [of the starting output of occupant crash protection] proper.
[0005]
[Means for Solving the Problem] The 1st sensor which outputs the signal according to the magnitude of the impact which the above-mentioned object is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection to indicate to claim 1, is arranged in the predetermined location in a car body, and joins a car, When the parameter based on the output signal of said 1st sensor reaches a predetermined threshold The starting output-control means which makes high the starting output of said occupant crash protection as compared with the case where the parameter based on the output signal of said 1st sensor does not reach said predetermined threshold, The 2nd sensor which outputs the signal according to the magnitude of the impact which is ahead arranged rather than said 1st sensor in a car body, and joins a car, The parameter based on the output signal of said 2nd sensor is attained by the starting control unit of the occupant crash protection characterized by having a threshold modification means to change said predetermined threshold according to whether the predetermined value was reached.
[0006] In invention according to claim 1, the threshold for controlling the starting output of occupant crash protection changes according to whether the parameter based on the output signal of the 2nd sensor arranged ahead reached the predetermined value rather than the 1st sensor. Even if the output signal of the 2nd sensor has the same collision rate, they differ according to the collision gestalt. Moreover, if collision gestalten differ, the values of a parameter based on the output signal of the 1st sensor which wants to make the starting output of occupant crash protection into high power differ. Therefore, it becomes possible to set up the above-mentioned predetermined value suitably, and to set up the above-mentioned threshold suitably, then to carry out adjustable [of the starting output of occupant crash protection] proper according to a

collision gestalt.
[0007] By the way, since a big impact generally joins only one side of car-body anterior part when a car carries out an irregular collision, as compared with the case where a car right-**, the output signal of the 2nd sensor shows a big value. Moreover, when it originates in an irregular collision and the output signal of the 2nd sensor shows a big value, the threshold for controlling the starting output of occupant crash protection may be small as compared with the case where a car right-**.
[0008] Therefore, in the starting control unit of occupant crash protection according to claim 1, when the parameter based on the output signal of said 2nd sensor reaches said predetermined value, it is good [said threshold modification means] also as changing said predetermined threshold into a small value as compared with the case where the parameter based on the output signal of said 2nd sensor does not reach said predetermined value, so that it may indicate to claim 2.
[0009] Moreover, the 1st sensor which outputs the signal according to the magnitude of the impact which the above-mentioned object is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection to indicate to claim 3, is arranged in the predetermined location in a car body, and joins a car, When the parameter based on the output signal of said 1st sensor does not reach the 1st threshold, the starting output of said occupant crash protection is made low. Moreover, the starting output-control means which makes high the starting output of said occupant crash protection when the parameter based on the output signal of said 1st sensor reaches the 2nd large threshold as compared with said 1st threshold, It is ahead arranged rather than said 1st sensor in a car body, and has the 2nd sensor which outputs the signal according to the magnitude of the impact which joins a car. Said starting output-control means In the bottom of the situation of the parameter based on the output signal of said 1st sensor having reached said 1st threshold, and having not reached said 2nd threshold The parameter based on the output signal of said 2nd sensor is attained by the starting control unit of the occupant crash protection characterized by changing the starting output of said occupant crash protection according to whether the predetermined value was reached.
[0010] In invention according to claim 3, the starting output of occupant crash protection is made high, when it is made low when the parameter based on the output signal of the 1st sensor does not reach the 1st threshold, and the 2nd large threshold is reached as compared with the 1st threshold. And the parameter based on the output signal of the 2nd sensor by which the parameter based on the output signal of the 1st sensor was ahead arranged in the bottom of the situation of having reached the 1st threshold and having not reached the 2nd threshold, rather than the 1st sensor changes according to whether the predetermined value was reached. Even if the output signal of the 2nd sensor has the same collision rate, they differ according to the collision gestalt. Moreover, if collision gestalten differ, the values of a parameter based on the output signal of the 1st sensor which wants to make the starting output of occupant crash protection into high power differ. Therefore, it becomes possible to set up the above-mentioned predetermined value suitably, and to set up the above-mentioned threshold suitably, then to carry out adjustable [of the output of occupant crash protection] proper according to a collision gestalt.
[0011] Moreover, the 1st sensor which outputs the signal according to the magnitude of the impact which the above-mentioned object is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection to indicate to claim 4, is arranged in the predetermined location in a car body, and joins a car, When the 1st parameter based on the output signal of said 1st sensor reaches a predetermined threshold The starting output-control means which makes high the starting output of said occupant crash protection as compared with the case where said 1st parameter does not reach said predetermined threshold, The 2nd sensor which outputs the signal according to the magnitude of the impact which is ahead arranged rather than said 1st sensor in a car body, and joins a car, The stage when said impact based on the output signal of said 2nd sensor reaches a predetermined reference value, The 2nd parameter based on the output signal of said 1st sensor is attained by the starting control unit of the occupant crash protection characterized by having a threshold modification means to change said predetermined threshold according to relation with the stage to reach a predetermined value.
[0012] In invention according to claim 4, the threshold for controlling the starting output of occupant crash protection changes according to the relation between the stage when the impact based on the output signal of the 2nd sensor arranged ahead reaches a predetermined reference value, and the stage when the 2nd parameter based on the output signal of the 1st sensor reaches a predetermined value rather than the 1st sensor. If collision gestalten differ, the thresholds about the 1st parameter based on the output signal of the 1st sensor with the case where he wants to make the starting output of occupant crash protection into the case where he wants to make it high power, and low-power output differ. Moreover, since the impact which

joins a car becomes large when a collision rate is large even if a collision gestalt is the same, it is desirable to make the starting output of occupant crash protection high as compared with the case where a collision rate is small. By the way, since the degree of car-body deformation becomes large so that a collision rate is large, the stage when the impact which joins car-body anterior part reaches a predetermined reference value becomes early. For this reason, when a collision rate is large, and the impact of car-body anterior part becomes to some extent large, the 2nd parameter based on the output signal of the 1st sensor is not not much large. That is, when the 2nd parameter becomes to some extent large, the impact of car-body anterior part is already large. On the other hand, when a collision rate is small, and the impact of car-body anterior part becomes to some extent large, the 2nd parameter is already large. That is, when the 2nd parameter becomes to some extent large, the impact of car-body anterior part is not not much large. Therefore, it becomes possible to set up suitably a reference value, the above-mentioned predetermined value, and the above-mentioned threshold predetermined [above-mentioned], then to carry out adjustable [of the starting output of occupant crash protection] proper according to a collision gestalt and a collision rate.

[0013] It sets to the starting control unit of occupant crash protection according to claim 4 so that it may indicate to claim 5. In this case, said threshold modification means When said impact based on the output signal of said 2nd sensor reaches said predetermined reference value and the 2nd parameter based on the output signal of said 1st sensor has not reached said predetermined value It is good also as changing said predetermined threshold into a small value as compared with the case where said 2nd parameter has reached said predetermined value.

[0014] Furthermore, the 1st sensor which outputs the signal according to the magnitude of the impact which the above-mentioned object is the starting control unit of the occupant crash protection which controls the starting output of occupant crash protection to indicate to claim 6, is arranged in the predetermined location in a car body, and joins a car, When the 1st parameter based on the output signal of said 1st sensor does not reach the 1st threshold, the starting output of said occupant crash protection is made low. Moreover, the starting output-control means which makes high the starting output of said occupant crash protection when the 1st parameter based on the output signal of said 1st sensor reaches the 2nd large threshold as compared with said 1st threshold, It is ahead arranged rather than said 1st sensor in a car body, and has the 2nd sensor which outputs the signal according to the magnitude of the impact which joins a car. Said starting output-control means In the bottom of the situation of the 1st parameter based on the output signal of said 1st sensor having reached said 1st threshold, and having not reached said 2nd threshold The stage when said impact based on the output signal of said 2nd sensor reaches a predetermined reference value, The 2nd parameter based on the output signal of said 1st sensor is attained by the starting control unit of the occupant crash protection characterized by changing the starting output of said occupant crash protection according to relation with the stage reaching a predetermined value.

[0015] In invention according to claim 6, the starting output of occupant crash protection is made high, when it is made low when the 1st parameter based on the output signal of the 1st sensor does not reach the 1st threshold, and the 2nd large threshold is reached as compared with the 1st threshold. And it changes according to the relation between the stage when the impact based on the output signal of the 2nd sensor by which the 1st parameter was ahead arranged in the bottom of the situation of having reached the 1st threshold and having not reached the 2nd threshold, rather than the 1st sensor reaches a predetermined reference value, and the stage when the 2nd parameter based on the output signal of the 1st sensor reaches a predetermined value.

[0016] If collision gestalten differ, the thresholds about the 1st parameter based on the output signal of the 1st sensor with the case where he wants to make the starting output of occupant crash protection into the case where he wants to make it high power, and low-power output differ. Moreover, since the impact which joins a car becomes large when a collision rate is large even if a collision gestalt is the same, it is desirable to make the starting output of occupant crash protection high as compared with the case where a collision rate is small. By the way, since the degree of car-body deformation becomes large so that a collision rate is large, the stage when the impact which joins car-body anterior part reaches a predetermined reference value becomes early. Therefore, it becomes possible to set up suitably a reference value, the above-mentioned predetermined value, and the above-mentioned threshold predetermined [above-mentioned], then to carry out adjustable [of the starting output of occupant crash protection] proper according to a collision gestalt and a collision rate.

[0017]

[Embodiment of the Invention] Drawing 1 shows system configuration drawing of the starting control unit of the occupant crash protection which is the 1st example of this invention. The system of this example is

equipped with the electronic control unit (ECU is called hereafter) 12 carried in a car 10, and is controlled by ECU12. Moreover, the system of this example is equipped with the floor sensor 14 arranged near the floor tunnel of a car-body center section, and the satellite sensors 16 and 18 arranged in the side member of right and left of car-body anterior part. The floor sensor 14 and the satellite sensors 16 and 18 are decelerating sensors of the electronic formula which outputs the signal according to the magnitude (specifically magnitude of the deceleration of a car cross direction) of the impact which acts on a car cross direction to each arrangement part, respectively.

[0018] ECU12 is constituted by the bus 28 of the read only memory (ROM is called hereafter) 24 in which the I/O circuit 20, the central processing unit (CPU is called hereafter) 22, the processing program, and the day bull required for an operation are stored beforehand, the random access memory (RAM is called hereafter) 26 used as a working area, and both directions which connect each of those elements.

[0019] The above-mentioned floor sensor 14 and the above-mentioned satellite sensors 16 and 18 are connected to the I/O circuit 20 of ECU12. The output signal of the floor sensor 14 and the output signal of the satellite sensors 16 and 18 are supplied to the I/O circuit 20, respectively, and are suitably stored in RAM26 according to directions of CPU22. ECU12 detects the magnitude GSL and GSR of the deceleration which acts on car-body left anterior part and car-body right anterior part at a car cross direction based on the output signal of the satellite sensors 16 and 18, respectively while detecting decelerating magnitude GF which acts on a car-body center section at a cross direction based on the output signal of the floor sensor 14.

[0020] The system of this example was carried in the car 10, and is equipped with the air bag equipment 30 which operates so that crew may be taken care of again. Air bag equipment 30 has the actuation circuit 32, Inflators 34a and 34b, and an air bag 36. Inflators 34a and 34b build in the ignitions 38a and 38b linked to the actuation circuit 32, and the generation-of-gas agent (not shown) which generates a lot of gas by generation of heat of Ignitions 38a and 38b, and carry out expansion expansion of the air bag 36 according to generating of gas. In addition, in this example, an air bag 36 carries out expansion expansion with high voltage, when the ignitions 38a and 38b in inflator 34a and 34b generate heat simultaneously, and when Ignitions 38a and 38b establish a certain amount of time difference and generate heat, it carries out expansion expansion with low voltage. When expansion expansion is carried out, the air bag 36 is arranged so that it may intervene between the crew of a car 10, and mounted components.

[0021] The actuation circuit 32 of air bag equipment 30 is connected to the I/O circuit 20 of ECU12. Air bag equipment 30 is started when a driving signal is supplied to the actuation circuit 32 from the I/O circuit 20, and an air bag 36 is developed. CPU22 of ECU12 is equipped with the starting control section 40 and the threshold modification section 42 for starting. The starting control section 40 of CPU22 controls the supply of a driving signal in the actuation circuit 32 of air bag equipment 30 from the I/O circuit 20 based on the distinction result while a predetermined parameter is calculated and the calculated parameter distinguishes whether the predetermined threshold SH1 is reached like the after-mentioned based on the deceleration GF detected using the output signal of the floor sensor 14 according to the processing program stored in ROM24. Moreover, the threshold modification section 42 for starting sets up suitably the predetermined threshold SH1 used in the above-mentioned starting control section 40 like the after-mentioned based on the deceleration GSL and GSR detected based on the output signal of the satellite sensors 16 and 18.

[0022] Moreover, CPU22 is equipped with the starting output-control section 44 and the threshold modification section 46 for an output. The starting output-control section 44 follows the processing program stored in ROM24. While a predetermined parameter is calculated and the calculated parameter distinguishes whether the predetermined threshold SH2 is reached like the after-mentioned based on the deceleration GF detected using the output signal of the floor sensor 14 Based on the relation between the deceleration GSL and GSR detected using the output signal of the satellite sensors 16 and 18, and the deceleration GF detected based on the output signal of the floor sensor 14, both the deceleration GSL and GSR distinguishes whether the predetermined threshold SH3 is reached. The starting output-control section 44 controls the output at the time of carrying out expansion expansion of the air bag 36 based on the above-mentioned distinction result.

[0023] Moreover, like the after-mentioned, the threshold modification section 46 for an output distinguishes whether based on the relation between Deceleration GSL and GSR and Deceleration GF, either of the deceleration GSL and GSR reached the large predetermined threshold SH4 as compared with the threshold SH3, and sets up suitably the predetermined threshold SH2 used in the above-mentioned starting output-control section 44 based on the distinction result.

[0024] Next, the content of the processing performed in CPU22 of this example is explained.

[0025] In this example, the starting control section 40 performs a predetermined operation to the deceleration GF detected based on the output signal of the floor sensor 14, and finds operation value f (GF)

and a rate Vn. Specifically, a rate Vn is a value acquired by carrying out time quadrature about Deceleration GF. That is, when Deceleration GF joins the car 10 under transit, since it accelerates to the front to a car 10 with an inertia force, a body (for example, crew) in the car can find the relative rate Vn to the car 10 of a body in the car by carrying out time quadrature of the deceleration GF. In addition, operation value f (GF) may be decelerating GF itself, and may be a value acquired by carrying out time quadrature of the deceleration GF about unit time amount. In addition, drawing which plotted the relation of the operation value f (GF) and the rate Vn under a predetermined situation for every fixed time amount is shown in drawing 2 . The starting control section 40 carries out the size comparison of the value defined from both relation as shown in drawing 2 R> 2 with the threshold SH1 in the judgment map set up by the threshold modification section 42 for starting, after finding operation value f (GF) and a rate Vn.

[0026] Drawing 3 shows drawing showing the change pattern (the threshold change pattern for starting is called hereafter) of a threshold SH1 which functions as a judgment map about the relation between operation value f (Gf) and a rate Vn in this example. In addition, the Hi map 1 which serves as criteria beforehand is a continuous line as a threshold change pattern for starting, and as compared with the Hi map 1, with the broken line, the small Lo map 1 of a threshold SH1 swerves, and is swerved and shown in drawing 3 .

[0027] In this example, the threshold modification section 42 for starting has memorized the threshold change pattern for starting about the relation of the operation value f (Gf) and the rate Vn which are set to the ****** experiment target which shows drawing 3 . These threshold change patterns for starting are set as the boundary with the case where the case where air bag equipment 30 needs to be started, and its need do not exist, when an impact joins a car 10.

[0028] That is, since possibility that the car 10 has collided becomes high so that the impact which joins car-body anterior part is great, it is appropriate to change the threshold change pattern for starting so that it may be easy to start air bag equipment 30 and it may become. Then, in this example, exceeding a predetermined value, the deceleration GSL and GSR detected based on the output signal of the satellite sensors 16 and 18 chooses a threshold change pattern for starting with which a threshold SH1 becomes small, when large, and it sets up the threshold modification section 42 for starting. When the Hi map 1 is specifically chosen as a threshold change pattern for starting when Deceleration GSL and GSR is below predetermined reference values, and Deceleration GSL and GSR exceeds a predetermined reference value, the Lo map 1 is chosen. In addition, on the occasion of setting out of the threshold change pattern for starting, a value is used for the direction [it is large either among Deceleration GSL and GSR].

[0029] In the above-mentioned configuration, the starting control section 40 the value defined from the relation between operation value f (GF) and a rate Vn The result compared with the threshold SH1 in the threshold change pattern for starting as a judgment map chosen and set up like the above in the threshold modification section 42 for starting, When the value which becomes settled from the relation between operation value f (GF) and a rate Vn exceeds the threshold SH1, a driving signal is supplied to the actuation circuit 32 of air bag equipment 30 from the I/O circuit 20. In this case, when air bag equipment 30 starts, an air bag 36 will be developed. On the other hand, when the value which becomes settled from the relation between operation value f (GF) and a rate Vn does not exceed the threshold SH1, the supply of a driving signal in the actuation circuit 32 of air bag equipment 30 from the I/O circuit 20 is forbidden.

[0030] Therefore, since according to this example it becomes easy to start air bag equipment 30 so that the impact which can control starting of air bag equipment 30 based on the degree.of the impact produced in the car-body center section, and joins car-body anterior part is great, it is possible to start air bag equipment 30 proper.

[0031] Moreover, in this example, the starting output-control section 44 calculates the deceleration GSL and GSR detected based on the output signal of the satellite sensors 16 and 18, and the value which becomes settled from relation with rate integralGF-dt while calculating the value which becomes settled from relation with rate integralGF-dt obtained by carrying out time quadrature about Deceleration GF and Deceleration GF which are detected based on the output signal of the floor sensor 14. And while carrying out the size comparison of the value which becomes settled from the relation between Deceleration GF and rate integralGF-dt with the threshold SH2 in the judgment map set up by the threshold modification section 46 for an output, the size comparison of the value which becomes settled from the relation between Deceleration GSL and GSR and rate integralGF-dt is carried out with the predetermined threshold SH3.

[0032] Drawing where drawing 4 plotted the relation between Deceleration GSL and GSR and rate integralGF-dt for every fixed time amount according to each collision gestalt is shown. Moreover, drawing where drawing 5 plotted the relation between Deceleration GF and rate integralGF-dt for every fixed time

amount according to each collision gestalt is shown. In addition, the change pattern (an AND map is called hereafter) of a threshold SH3 which functions as a judgment map about the relation between Deceleration GSL and GSR and rate integralGF-dt is a broken line, and the change pattern (OR map is called hereafter) of the threshold SH4 as a judgment map about the relation between Deceleration GSL and GSR and rate integralGF-dt is shown to drawing 4 by the continuous line, respectively. The Hi map 2 which serves as criteria beforehand is a continuous line as a change pattern (the threshold change pattern for an output is called hereafter) of a threshold SH2 which functions as a judgment map about the relation between Deceleration GF and rate integralGF-dt, and the small Lo map 2 of a threshold SH2 is shown to drawing 5 by the broken line as compared with the Hi map 2, respectively.

[0033] In this example, the threshold modification section 46 for an output has memorized the threshold change pattern for an output about the relation of Deceleration GF and rate integralGF-dt which were set to the ****** experiment target which shows drawing 5 while having memorized the AND map about the relation of Deceleration GSL and GSR and rate integralGF-dt which were set to the ****** experiment target which shows drawing 4 , and OR map. The AND map and the threshold change pattern for an output are set as the boundary with the case where the output at the time of starting air bag equipment 30 is made into the case where it is made high power, and low-power output. Moreover, OR map is set as the boundary with the case where the case where the Hi map 2 is chosen and set up as a threshold change pattern for an output, and the Lo map 2 are chosen and set up.

[0034] That is, under the situation that the car 10 right-**(ed), when the output at the time of air bag equipment 30 being started (a starting output is called hereafter) is made into high power when a big impact joins the car-body center section crew gets into [center section], and the not much big impact is not added, it is appropriate to make it low-power output. Moreover, since possibility that a big impact joins a car-body center section is high also when a both to some extent big impact joins right and left of car-body anterior part, it is appropriate to make the starting output of air bag equipment 30 into high power.

[0035] Then, in this example, the starting output-control section 44 sets the starting output of air bag equipment 30 as high power, when the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14 and rate integralGF-dt exceeds the threshold SH2 of the Hi map 2. Moreover, also when the value which the value which becomes settled from the relation between rate integralGF-dt and the deceleration GSL based on the output signal of the satellite sensor 16 exceeds the threshold SH3 of an AND map, and becomes settled from relation with the deceleration GSR based on the output signal of rate integralGF-dt and the satellite sensor 18 exceeds the threshold SH3 of an AND map, the starting output of air bag equipment 30 is set as high power.

[0036] Therefore, according to this example, when a big impact joins a car-body center section, or when a both to some extent big impact joins right and left of car-body anterior part, the starting output at the time of starting of air bag equipment 30 can be made high. For this reason, according to this example, it becomes possible to start air bag equipment 30 so that crew may be effectively taken care of corresponding to the magnitude of the impact which joins a car 10.

[0037] By the way, there are an ORB (Offset Rigid Barrier) type with which the object which cannot deform easily, and a car 10 collide, and an ODB (Offset Deformable Barrier) type of offset collision with which the object which is easy to deform, and a car 10 collide. Although the impact which joins a car-body center section as compared with the time of right ** becomes small since an object deforms when this ODB type of offset collision arises, there is a case (for example, collision rate 56 km/h) where he wants to make the starting output of an air bag 30 high also in this case.

[0038] If the threshold change pattern for an output is maintained by the Hi map 2 when offset collision this point and ODB type arises in collision rate 56 km/h, it will become difficult for the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14 and rate integralGF-dt to exceed the threshold SH2 of the Hi map 2. moreover -- offset collision -- right and left of car-body anterior part -- although either of the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 shows a very big value since the big impact for any their being is added, neither of value which becomes settled from the relation between rate integralGF-dt and Deceleration GSL and GSR exceeds the threshold SH2 of an AND map Therefore, when ODB type offset collision arises, in order to make high the starting output of air bag equipment 30, it becomes effective to change the threshold change pattern for an output into the small map of a threshold SH2.

[0039] When ODB type offset collision arises, either of the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 shows a very big value like ****. In this example then, the threshold modification section 46 for an output The value which becomes settled from the relation between rate

integralGF-dt based on the output signal of the floor sensor 14, and the deceleration GSL based on the output signal of the satellite sensor 16, And either of the values which become settled from relation with the deceleration GSR based on the output signal of the rate integralGF, dt, and the satellite sensor 18 based on the output signal of the floor sensor 14 Based on whether the threshold SH4 of large OR map was exceeded as compared with the threshold SH3 of an AND map, the threshold change pattern for an output is chosen and set up so that a threshold SH2 may become small. Specifically When not exceeding the threshold SH4 of OR map, the Hi map 2 is chosen as a threshold change pattern for an output. any of the value which becomes settled from the relation between rate integralGF-dt based on the output signal of the floor sensor 14, and the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 -- although -- Moreover, when any of those values they are exceeds the threshold SH4 of OR map, the Lo map 2 is chosen as a threshold change pattern for an output.

[0040] in addition, the case where a car 10 **** near collision rate 30 km/h -- the ODB type offset collision in collision rate 56 km/h -- the same -- right and left of car-body anterior part -- since the big impact for any their being is added, the value which becomes settled from the relation between rate integralGF-dt and Deceleration GSL and GSR turns into a value approximated mutually. However, it is appropriate to carry out low-power output of the starting output of air bag equipment 30 in this case. Then, at the time of **** near collision rate 30 km/h, the starting output of air bag equipment 30 turns into low-power output, and at the time of the ODB type offset collision near collision rate 56 km/h, the Lo map 2 is set up so that the starting output of air bag equipment 30 may turn into high power.

[0041] In the above-mentioned configuration the starting output-control section 44 Either of the values which become settled from the relation between rate integralGF-dt based on the output signal of the floor sensor 14 and the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 exceeds the threshold SH4 of OR map. And when the value which becomes settled from the relation between Deceleration GF and rate integralGF-dt exceeds the threshold SH2 of the Lo map 2, the starting output at the time of air bag equipment 30 being started is set as high power. Although either of the values which become settled from the relation between rate integralGF-dt and Deceleration GSL and GSR exceeds the threshold SH4 of OR map, when the value which becomes settled from the relation between Deceleration GF and rate integralGF-dt, on the other hand, does not exceed the threshold SH2 of the Lo map 2, the starting output at the time of air bag equipment 30 being started is set as low-power output.

[0042] Therefore, according to this example, the starting output of air bag equipment 30 is made into high power when ODB type offset collision arises, and it becomes possible to make it low-power output, when **** arises, and this becomes possible to carry out adjustable [of the starting output of air bag equipment 30] proper according to a collision gestalt.

[0043] Drawing 6 shows the flow chart of an example of the control routine which ECU12 performs in this example that the threshold change pattern for an output should be set up. The routine shown in drawing 6 is a routine repeatedly started for every predetermined time. Starting of the routine shown in drawing 6 performs processing of step 100 first.

[0044] At step 100, while processing which reads the deceleration GSL and GSR which acts on a car cross direction, respectively into right and left of the car-body anterior part detected based on the output signal of the satellite sensors 16 and 18 is performed, processing which reads the deceleration GF which acts on a car cross direction into the car-body center section detected based on the output signal of the floor sensor 14 is performed.

[0045] At step 102, processing which computes rate integralGF-dt is performed by carrying out time quadrature about the deceleration GF read at the above-mentioned step 100.

[0046] At step 104, it is distinguished whether either of the deceleration GSL and GSR read at the above-mentioned step 100 exceeds the threshold SH4 of OR map. When either GSL>SH4 and GSR>SH4 are materialized, the ODB type offset collision near collision rate 56 km/h may have arisen on the car 10, and even if a big impact does not join a car-body center section, there is a case where he wants to make the starting output of air bag equipment 30 into high power. Therefore, when this distinction is made, processing of step 106 is performed next.

[0047] At step 106, processing which chooses the small Lo map 2 of a threshold SH2 as a threshold change pattern for an output is performed. Activation of processing of this step 106 judges the starting output at the time of air bag equipment 30 being started henceforth by comparing the threshold SH2 on the Lo map 2 with the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14, rate integralGF, and dt. Termination of processing of this step 106 ends this routine.

[0048] on the other hand -- the above-mentioned step 104 -- setting -- both GSL>SH4 and GSR>SH4 -- although -- the case where it is not materialized -- GSL>SH4 -- Or while it is necessary to continue selection of the Lo map 2 as a threshold change pattern for an output under a situation once GSR>SH4 is materialized yet -- both GSL>SH4 and GSR>SH4 -- although -- the bottom of the situation of not being materialized -- as the threshold change pattern for an output -- the Lo map 2 -- it is not necessary to choose -- usually -- a passage -- Hi map -- it becomes suitable to continue selection. Therefore, when this distinction is made, the above-mentioned step 106 is jumped and this routine is ended.
[0049] According to the above-mentioned processing, when a big impact joins one of right and left of car-body anterior part, the threshold change pattern for an output is set as the small map of a threshold SH2. For this reason, when ODB type offset collision produces the starting output at the time of air bag equipment 30 being started according to this example, even if the impact which joins a car-body center section is small, when it is set as high power and **** arises, it becomes possible to set it as low-power output.
[0050] Drawing 7 shows the flow chart of an example of the control routine which ECU12 performs in this example that the starting output of air bag equipment 30 should be judged. The routine shown in drawing 7 is a routine repeatedly started for every predetermined time. Starting of the routine shown in drawing 7 performs processing of step 120 first.
[0051] At step 120, processing which reads the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 and the deceleration GF based on the output signal of the floor sensor 14 is performed like the above-mentioned step 100.
[0052] At step 122, processing which computes rate integralGF-dt by carrying out time quadrature of the deceleration GF like the above-mentioned step 102 is performed.
[0053] At step 124, it is distinguished whether both the deceleration GSL and GSR read at the above-mentioned step 120 exceeds the threshold SH3 of an AND map. When GSL>SH3 is materialized and GSR>SH3 is materialized, it can be judged that the both to some extent big impact joined right and left of car-body anterior part. Therefore, when this distinction is made, processing of step 126 is performed next.
[0054] At step 126, processing which sets the starting output at the time of air bag equipment 30 being started as high power is performed. If processing of this step 126 is performed, in case air bag equipment 30 will be started henceforth, a driving signal with which ignition 38a in inflator 34a and ignition 38b in inflator 34b generate heat almost simultaneous is supplied to the actuation circuit 32 from the I/O circuit 20. In this case, expansion expansion of the air bag 36 will be carried out with high voltage because Inflators 34a and 34b generate gas almost simultaneous. In addition, when a starting output is set as high power in this step 126, the condition is henceforth maintained during a fixed period. Termination of processing of this step 126 ends this routine.
[0055] When GSL>SH3 is not materialized in the above-mentioned step 124, or GSR>SH3 was not materialized and it is distinguished on the other hand, processing of step 128 is performed next.
[0056] At step 128, it is distinguished whether the deceleration GF read at the above-mentioned step 120 exceeds the threshold SH2 of the threshold change pattern for an output set up by performing the routine shown in above-mentioned drawing 6 . Consequently, when GF>SH2 was materialized and it is distinguished, processing of the above-mentioned step 126 is performed next. On the other hand, when GF>SH2 was not materialized and it is distinguished, processing of step 130 is performed next.
[0057] At step 130, processing which sets the starting output at the time of air bag equipment 30 being started as low-power output is performed. If processing of this step 130 is performed, in case air bag equipment 30 will be started henceforth, a driving signal with which ignition 38a in inflator 34a and ignition 38b in inflator 34b predetermined-time-shift to the actuation circuit 32, and generate heat from the I/O circuit 20 to it is supplied. In this case, expansion expansion of the air bag 36 will be comparatively carried out with low voltage because the stage to generate the gas of Inflators 34a and 34b shifts. In addition, even if a starting output is set as low-power output in this step 130, when the starting output is already set as high power, setting out of high power is maintained until the condition carries out fixed period progress. Termination of processing of this step 130 ends this routine.
[0058] According to the above-mentioned processing, when a both to some extent big impact joins right and left of car-body anterior part, or when a big impact joins a car-body center section exceeding the threshold SH2 set up by activation of a routine shown in above-mentioned drawing 6 R> 6, the starting output of air bag equipment 30 can be set as high power. Therefore, also when a car 10 right-**, and also when an ODB type carries out offset collision according to this example, the starting output at the time of air bag equipment 30 being started is set up proper. That is, according to a collision gestalt, adjustable [of the starting output of air bag equipment 30] is carried out proper. For this reason, according to the system of

this example, it is possible to restrain crew effectively according to that collision gestalt at the time of a car collision.

[0059] In the 1st above-mentioned example, air bag equipment 30 to in addition, the "occupant crash protection" indicated to the claim The floor sensor 14 in the "1st sensor" indicated to the claim In "the parameter based on the output signal of the 1st sensor" indicated to claim 1, the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14 and its rate integralGF-dt obtained by carrying out time quadrature The satellite sensors 16 and 18 in the "2nd sensor" indicated to the claim Time quadrature is carried out about the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18, and the deceleration GF based on the output signal of the floor sensor 14. The value which becomes settled from relation with rate integralGF-dt obtained is equivalent to the "parameter based on the output signal of the 2nd sensor" indicated to claims 1 and 2, respectively.

[0060] Moreover, in the 1st above-mentioned example, the "threshold modification means" which the "starting output-control means" which ECU12 indicated to claim 1 by performing processing of step 126 after processing of the above-mentioned step 128 indicated to claims 1 and 2 by performing processing of the above-mentioned step 106 according to the processing result of the above-mentioned step 104 is realized, respectively.

[0061] Next, with reference to drawing 8 , the 2nd example of this invention is explained with above-mentioned drawing 1 and drawing 7 . The system of this example is realized by making ECU12 perform the routine shown in drawing 8 in the starting control device of the occupant crash protection shown in above-mentioned drawing 1 .

[0062] Drawing 8 shows the flow chart of an example of the control routine which ECU12 performs in this example that the starting output of air bag equipment 30 should be judged. The routine shown in drawing 8 is a routine repeatedly started for every predetermined time. in addition, the sign same about the step which performs the same processing as the step in the routine shown in above-mentioned drawing 7 in drawing 8 -- giving -- the explanation -- an abbreviation -- or it carries out simple. That is, in the routine shown in drawing 8 , after a negative judging is made at step 124, processing of step 140 is performed next.

[0063] At step 140, it is distinguished whether the deceleration GF read at the above-mentioned step 120 exceeds the threshold SH2 of the Hi map 2. Since it can judge that the big impact joined the car-body center section when GF>SH2 is materialized in this step 140, it is appropriate to make the starting output of air bag equipment 30 into high power irrespective of the magnitude of the impact in car-body anterior part. Therefore, when GF>SH2 was materialized in this step 140 and it is distinguished, processing which sets the starting output at the time of next air bag equipment 30 being started at the above-mentioned step 126 as high power is performed. On the other hand, when GF>SH2 was not materialized in this step 140 and it is distinguished, processing of step 142 is performed next.

[0064] At step 142, it is distinguished whether Deceleration GF exceeds the threshold SH2 of the Lo map 2. If the very big impact has joined one of right and left of car-body anterior part when GF>SH2 is materialized in this step 142, since it can judge that offset collision was carried out, the thing whose car 10 is an ODB type and for which the starting output of air bag equipment 30 is made into high power is suitable. Therefore, when this distinction is made in this step 142, processing of step 144 is performed next. On the other hand, when GF>SH2 is not materialized in this step 142, it can be judged that such a big impact is not added that the starting output of air bag equipment 30 is made into high power in the car-body center section. Therefore, when this distinction is made in this step 142, processing which sets the starting output at the time of next air bag equipment 30 being started at the above-mentioned step 130 as low-power output is performed.

[0065] At step 144, it is distinguished whether either of the deceleration GSL and GSR exceeds the threshold SH4 of OR map. When either GSL>SH4 and GSR>SH4 are materialized, it can be judged that the ODB type offset collision near collision rate 56 km/h has arisen on the car 10. Therefore, when this distinction is made, processing of the above-mentioned step 126 is performed next that the starting output of air bag equipment 30 should be made high power. on the other hand -- both GSL>SH4 and GSR>SH4 -- although -- when not materialized, it can be judged that the ODB type offset collision near collision rate 56 km/h has not arisen on a car 10. Therefore, when this distinction is made, processing of the above-mentioned step 130 is performed next that the starting output of air bag equipment 30 should be made low-power output.

[0066] When according to the above-mentioned processing a both to some extent big impact joins right and left of car-body anterior part and a big impact joins a car-body center section, or when a very big impact

joins one of right and left of car-body anterior part and a to some extent big impact joins a car-body center section, the starting output of air bag equipment 30 can be set as high power. That is, in this example, when ODB type offset collision arises, even if the impact which joins a car-body center section is not so great, the starting output of air bag equipment 30 is set as high power. Thus, according to this example, it is possible to carry out adjustable [of the starting output at the time of air bag equipment 30 being started] proper according to the collision gestalt of a car. For this reason, also in the system of this example, it is possible to restrain crew effectively according to that collision gestalt at the time of a car collision.

[0067] In the 2nd above-mentioned example, the threshold SH2 of the Lo map 2 to in addition, the "1st threshold" indicated to claim 3 To the "2nd threshold" which the threshold SH2 of the Hi map 2 indicated to claim 3, while the threshold SH4 of OR map is equivalent to the "predetermined value" indicated at claim 3, respectively When ECU12 performs the above-mentioned steps 126 and 130 and processing of 140-144, the "starting output-control means" indicated to claim 3 is realized.

[0068] Next, with reference to drawing 9 thru/or drawing 11 , the 3rd example of this invention is explained with above-mentioned drawing 1 , drawing 6 , and drawing 7 . The system of this example is realized by making ECU12 perform the routine shown drawing 11 R>1 in the starting control device of the occupant crash protection shown in above-mentioned drawing 1 .

[0069] By the way, in ODB type offset collision, when a collision rate is near 64 km/h, while it is necessary to make the starting output of air bag equipment 30 into high power, when a collision rate is about 40km/h, it is not necessary to make the starting output of air bag equipment 30 into high power.

[0070] Drawing 9 shows drawing which is with the case where they are the case where collision rates are 40 km/h, and 64 km/h, and compared time amount change of rate integralGF-dt at the time of ODB type offset collision. Moreover, drawing 10 shows drawing which is with the case where they are the case where collision rates are 40 km/h, and 64 km/h, and plotted the relation between Deceleration GF and rate integralGF-dt for every fixed time amount at the time of ODB type offset collision. In addition, in drawing 9 and drawing 10 , it is a continuous line, and it is an alternate long and short dash line, swerves, and swerves from the case where collision rates are 64 km/h, and the case where collision rates are 40 km/h is shown.

[0071] Although the Lo map 2 is set up like **** so that the starting output of air bag equipment 30 may turn into low-power output at the time of **** near collision rate 30 km/h and the starting output of air bag equipment 30 may turn into high power at the time of the ODB type offset collision near collision rate 56 km/h As shown in drawing 10 , even if collision rates are 40 km/h in ODB type offset collision Moreover, even if it is 64 km/h, the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14 and its rate integralGF-dt obtained by carrying out time quadrature arrives at the field surrounded by Lo2 map and Hi map. Therefore, when making the starting output of air bag equipment 30 into high power when collision rates are 64 km/h, and collision rates are 40 km/h and it is set as low-power output, the threshold change pattern for an output about the relation between Deceleration GF and rate integralGF-dt is set as the Lo map 2, when collision rates are 64 km/h, and when collision rates are 40 km/h, it becomes suitable to set it as the Hi map 2.

[0072] By the way, when the case where they are the case where collision rates are 40 km/h, and 64km/h is compared, while the violence of a collision is small and the deformation of car-body anterior part is small, the violence of a collision is large and the deformation of car-body anterior part is large [in 64 km/h,] in 40 km/h. For this reason, the stage when the impact which joins car-body anterior part becomes to some extent large becomes early, so that a collision rate is large. When this point and a collision rate are large, as an alternate long and short dash line shows to drawing 9 , even if the impact of car-body anterior part becomes to some extent large, the car-body center section is seldom slowing down at that event. That is, when the to some extent big slowdown by collision arises in the car-body center section, the big impact has also already joined car-body anterior part. On the other hand, as a continuous line shows to drawing 9 , when a collision rate is small, and the impact of car-body anterior part becomes to some extent large, the car-body center section has already slowed down to some extent. That is, when the to some extent big slowdown by collision arises in the car-body center section, the impact of car-body anterior part is not not much large.

[0073] Therefore, the reference value which the deceleration GSL and GSR based on the output signal of the satellite sensors 16 and 18 should attain when the impact of car-body anterior part becomes large, And if the predetermined value which rate integralGF based on the output signal of the floor sensor 14 and dt should attain is suitably set up when a car-body center section slows down to some extent It becomes possible to distinguish the case where it is generated in the case where ODB type offset collision arises in collision rate 40 km/h, and 64 km/h, with the relation between the stage when Deceleration GSL and GSR reached the reference value, and the stage when rate integralGF-dt reached the predetermined value. Thereby, at the time

of ODB type offset collision, when collision rates are 64 km/h, the starting output of air bag equipment 30 is made into high power, and when collision rates are 40 km/h, it becomes possible to set the starting output of air bag equipment 30 as low-power output.
[0074] Drawing 11 shows the flow chart of an example of the control routine which ECU12 performs in this example that the threshold change pattern for an output should be set up. The routine shown in drawing 11 is a routine repeatedly started for every predetermined time. in addition, the sign same about the step which performs the same processing as the step in the routine shown in above-mentioned drawing 6 in drawing 11 -- giving -- the explanation -- an abbreviation -- or it carries out simple. That is, in the routine shown in drawing 11 , after rate integralGF-dt is computed at step 102, processing of step 200 is performed next.
[0075] At step 200, it is distinguished whether either of the deceleration GSL and GSR read at the above-mentioned step 100 exceeds a predetermined reference value. In addition, predetermined reference values are the deceleration GSL and GSR which can be judged that the to some extent big impact has joined car-body anterior part, and are in agreement with the value for changing the threshold change pattern for starting on the Hi map 1 and the Lo map 1. Consequently, since it can judge that the impact of car-body anterior part became to some extent large when an affirmation judging is made, processing of step 202 is performed next. On the other hand, this routine is ended when a negative judging is made.
[0076] At step 202, it is distinguished whether rate integralGF-dt computed at the above-mentioned step 102 exceeds the predetermined value V0. Consequently, when an affirmation judging is made, and the impact of car-body anterior part becomes to some extent large, it can be judged that the car-body center section has already slowed down to some extent. In this case, in ODB type offset collision, it can judge that a collision rate is small and it becomes suitable to set the starting output of air bag equipment 30 as low-power output. Therefore, when this distinction is made, this routine is ended, without changing the threshold change pattern for an output so that it may usually maintain on the Hi map 2 of a passage.
[0077] On the other hand, when a negative judging is made, it can be judged that the car-body center section is seldom slowing down even if the impact of car-body anterior part becomes to some extent large. In this case, in ODB type offset collision, it can judge that a collision rate is large and it becomes suitable to set the starting output of air bag equipment 30 as high power. Therefore, when this distinction is made, processing which chooses the small Lo map 2 of a threshold SH2 as a threshold change pattern for an output in the above-mentioned step 106 next is performed.
[0078] According to the above-mentioned processing, when a big impact joins a car-body center section, or when a to some extent big impact joins one of right and left of car-body anterior part and the car-body center section is seldom slowing down, the threshold change pattern for an output is set as the small map of a threshold SH2. For this reason, according to this example, at the time of ODB type offset collision, it becomes possible to distinguish the case where they are the case where collision rates are 64 km/h, and 40 km/h, proper, and to set it up, distinguishing the time of the ODB type offset collision in collision rate 56 km/h, and **** proper, and setting up the starting output of air bag equipment 30.
[0079] In this example, after the routine shown in above-mentioned drawing 11 is performed, the routine shown in above-mentioned drawing 7 is performed using the threshold SH2 of the threshold change pattern for an output set up as the result. Consequently, when a big impact is added exceeding the threshold SH2, the starting output of air bag equipment 30 is set as high power. Therefore, according to this example, while adjustable [of the starting output at the time of air bag equipment 30 being started] is carried out proper according to a collision gestalt, at the time of ODB type offset collision, adjustable [of it] is carried out proper according to a collision rate. For this reason, according to the system of this example, it is possible to restrain crew effectively according to that collision gestalt and a collision rate at the time of a car collision.
[0080] Moreover, in this example, the predetermined reference value about Deceleration GSL and GSR used for setting out of the starting output of air bag equipment 30 is in agreement with the value for changing the threshold change pattern for starting. For this reason, in this example, the satellite sensors 16 and 18 do not need to be sensors of the electronic formula which outputs the signal according to the magnitude of the deceleration GSL and GSR produced in a car cross direction, and when the deceleration which exceeds a predetermined value to a car cross direction arises, you may be the sensor of the mechanical cable type which outputs an ON signal. In this case, when the impact which joins car-body anterior part is great, it becomes possible to realize the configuration to which air bag equipment 30 is made easy to start, and it carries out adjustable [of the starting output of air bag equipment 30] proper according to a collision gestalt and a collision rate with a simple configuration.
[0081] In the 3rd above-mentioned example, the value which becomes settled from the relation between the deceleration GF based on the output signal of the floor sensor 14 and its rate integralGF-dt obtained by

carrying out time quadrature in in addition, the "1st parameter" indicated to claim 4 While it is equivalent to the "2nd parameter" which rate integralGF obtained by carrying out time quadrature and dt indicated to claims 4 and 5 about the deceleration GF based on the output signal of the floor sensor 14, respectively When ECU12 performs processing of the above-mentioned step 106 according to the processing result of the above-mentioned steps 200 and 202, the "threshold modification means" indicated to claims 4 and 5 is realized.

[0082] Next, with reference to drawing 12 , the 4th example of this invention is explained with above-mentioned drawing 1 , drawing 7 , and drawing 8 . The system of this example is realized by making ECU12 perform the routine shown in drawing 12 in the starting control device of the occupant crash protection shown in above-mentioned drawing 1 .

[0083] Drawing 12 shows the flow chart of an example of the control routine which ECU12 performs in this example that the starting output of air bag equipment 30 should be judged. The routine shown in drawing 12 is a routine repeatedly started for every predetermined time. in addition, the sign same about the step which performs the same processing as the step in the routine shown in above-mentioned drawing 7 and drawing 8 in drawing 12 -- giving -- the explanation -- an abbreviation -- or it carries out simple. That is, in the routine shown in drawing 12 , after the processing which computes rate integralGF-dt by carrying out time quadrature of the deceleration GF at the above-mentioned step 122 is made, processing of step 220 is performed next.

[0084] At step 220, it is distinguished whether the deceleration GF read at the above-mentioned step 120 exceeds the threshold SH2 of the Hi map 2. Since it can judge that the big impact joined the car-body center section when GF>SH2 is materialized in this step 220, it is appropriate to make the starting output of air bag equipment 30 into high power irrespective of the magnitude of the impact in car-body anterior part. Therefore, when GF>SH2 was materialized in this step 220 and it is distinguished, processing which sets the starting output at the time of next air bag equipment 30 being started at the above-mentioned step 126 as high power is performed. On the other hand, when GF>SH2 was not materialized in this step 220 and it is distinguished, processing of step 222 is performed next.

[0085] At step 222, it is distinguished whether Deceleration GF exceeds the threshold SH2 of the Lo map 2. Under the situation that GF>SH2 is materialized in this step 222, it is appropriate that a car 10 makes high power the starting output of air bag equipment 30 when an ODB type carries out offset collision near collision rate 56 km/h. Moreover, it is appropriate that a car 10 makes the starting output of air bag equipment 30 low-power output when an ODB type carries out offset collision by about 40km/h in collision rate. Therefore, when this distinction is made in this step 222, processing of step 224 is performed next. On the other hand, when GF>SH2 is not materialized in this step 222, it can be judged that such a big impact is not added that the starting output of air bag equipment 30 is made into high power in the car-body center section. Therefore, when this distinction is made in this step 222, processing which sets the starting output at the time of next air bag equipment 30 being started at the above-mentioned step 130 as low-power output is performed.

[0086] At step 224, it is distinguished whether either of the deceleration GSL and GSR exceeds a predetermined reference value. Consequently, since it can judge that the impact of car-body anterior part became to some extent large when an affirmation judging is made, processing of step 226 is performed next. On the other hand, when a negative judging is made, processing of the above-mentioned step 130 is performed next.

[0087] At step 226, it is distinguished whether rate integralGF-dt exceeds the predetermined value V0. Consequently, when an affirmation judging is made, and the impact of car-body anterior part becomes to some extent large, it can be judged that the car-body center section has already slowed down to some extent. In this case, in ODB type offset collision, it can judge that a collision rate is small and it becomes suitable to set the starting output of air bag equipment 30 as low-power output. Therefore, when this distinction is made, processing of the above-mentioned step 130 is performed next.

[0088] On the other hand, when a negative judging is made, it can be judged that the car-body center section is seldom slowing down even if the impact of car-body anterior part becomes to some extent large. In this case, in ODB type offset collision, it can judge that a collision rate is large and it becomes suitable to set the starting output of air bag equipment 30 as high power. Therefore, when this distinction is made, processing of the above-mentioned step 126 is performed next.

[0089] According to the above-mentioned processing, when a big impact joins a car-body center section, or when a to some extent big impact joins one of right and left of car-body anterior part and the car-body center section is seldom slowing down, the starting output of air bag equipment 30 can be set as high power. In this

case, while adjustable [of the starting output of air bag equipment 30] is carried out proper according to a collision gestalt, at the time of ODB type offset collision, adjustable [of it] is carried out proper according to the magnitude of that collision rate. For this reason, according to the system of this example, it is possible to restrain crew effectively according to a collision rate at the time of ODB type offset collision.

[0090] In the 4th above-mentioned example, to in addition, the "1st threshold" indicated to claim 6 While it is equivalent to the "predetermined value" indicated at claim 6 to the "predetermined reference value" indicated at claim 6 to the "2nd threshold" indicated to claim 6, respectively When ECU12 performs the above-mentioned steps 126 and 130 and processing of 220-226, the "starting output-control means" indicated to claim 6 is realized.

[0091] In addition, it sets to the routine shown in drawing 11 in the 3rd example of the above, and the routine shown in drawing 12 in the 4th example of the above. Although the threshold change pattern for an output was changed into the Lo map 2 or the starting output of air bag equipment 30 is changed into high power according to whether rate integralGF-dt is over the predetermined value V0 when either of the deceleration GSL and GSR exceeds a predetermined reference value This invention is good also as either of the deceleration GSL and GSR changing the starting output of the threshold change pattern for an output, or an air bag 30 according to whether it is over the predetermined reference value, when it is not limited to this and rate integralGF-dt exceeds the predetermined value V0. When rate integralGF-dt exceeds the predetermined value V0 and either of the deceleration GSL and GSR is over the predetermined reference value in this configuration The threshold change pattern for an output is changed into the Lo map 2. Or while changing the starting output of air bag equipment 30 into high power When rate integralGF-dt exceeds the predetermined value V0 and either of the deceleration GSL and GSR is not over the predetermined reference value, the threshold change pattern for an output will be maintained on the Hi map 2, or the starting output of air bag equipment 30 will be maintained to low-power output.

[0092] By the way, it sets in the above-mentioned 1st thru/or the 4th above-mentioned example. Although a certain amount of time difference is established and Ignitions 38a and 38b are made to generate heat when making the ignitions 38a and 38b in inflator 34a and 34b generate heat almost simultaneous when starting air bag equipment 30 by high power, and starting air bag equipment 30 by low-power output The technique of making the starting output of air bag equipment 30 change by high power and low-power output is good for time amount until it is not limited to this, and it may prepare a difference in the calorific value of Ignitions 38a and 38b and Ignitions 38a and 38b generate heat also as establishing a difference.

[Effect of the Invention] According to invention according to claim 1 to 3, like ****, it can carry out adjustable [of the starting output of occupant crash protection] proper according to a collision gestalt.

[0093] Moreover, according to invention according to claim 4 to 6, according to a collision gestalt and a collision rate, it can carry out adjustable [of the starting output of occupant crash protection] proper.

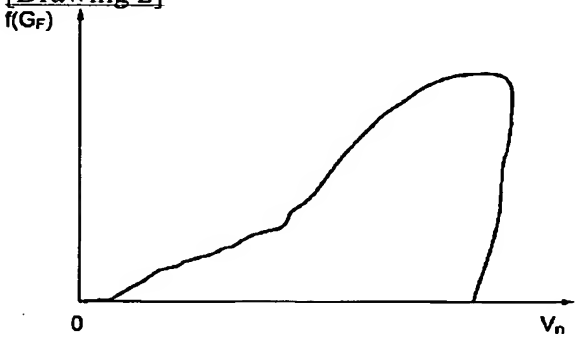
[Translation done.]

* NOTICES *

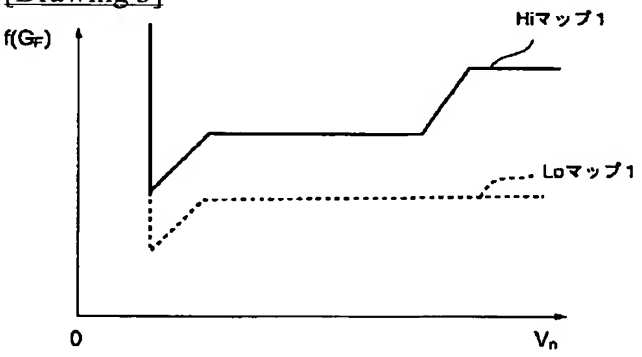
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

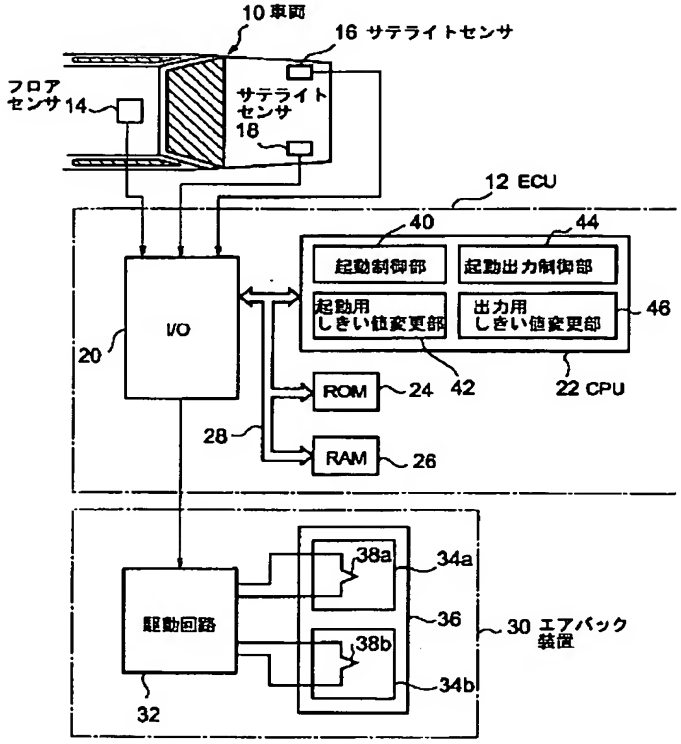
[Drawing 2]



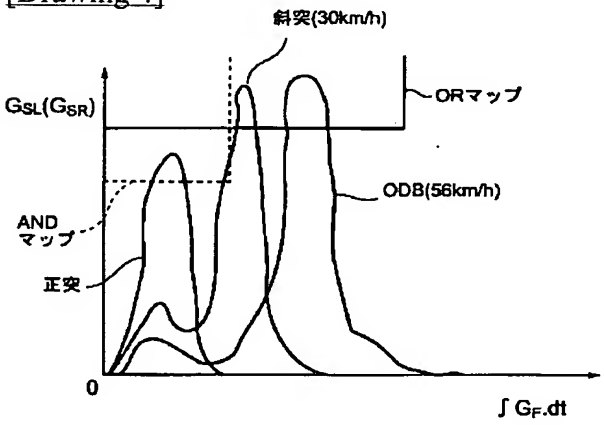
[Drawing 3]



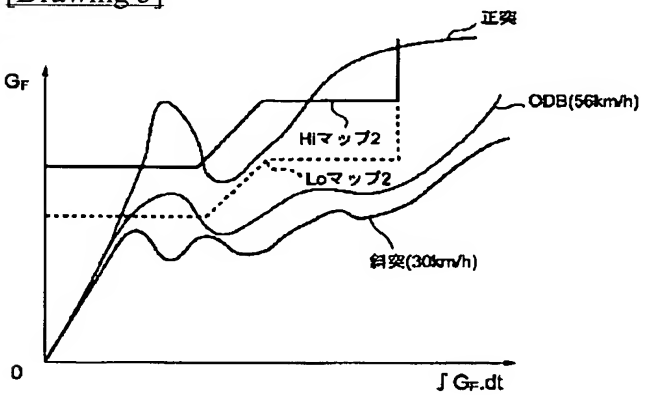
[Drawing 1]



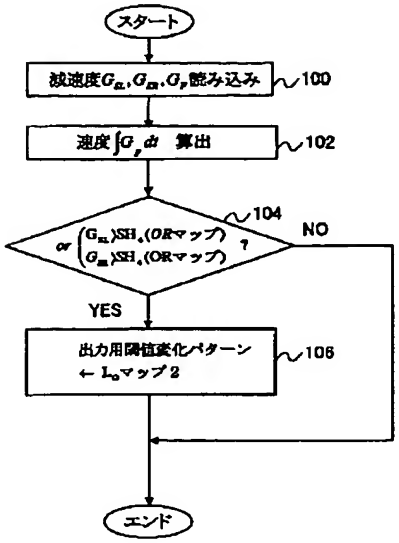
[Drawing 4]



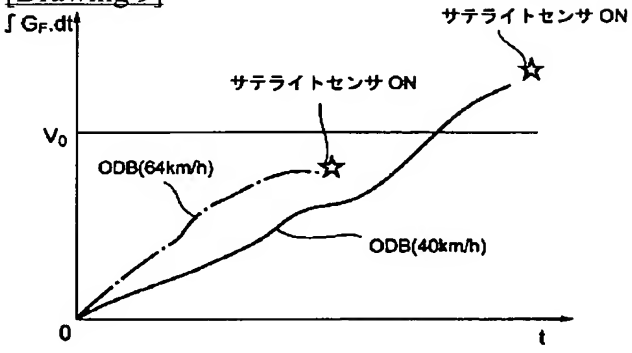
[Drawing 5]



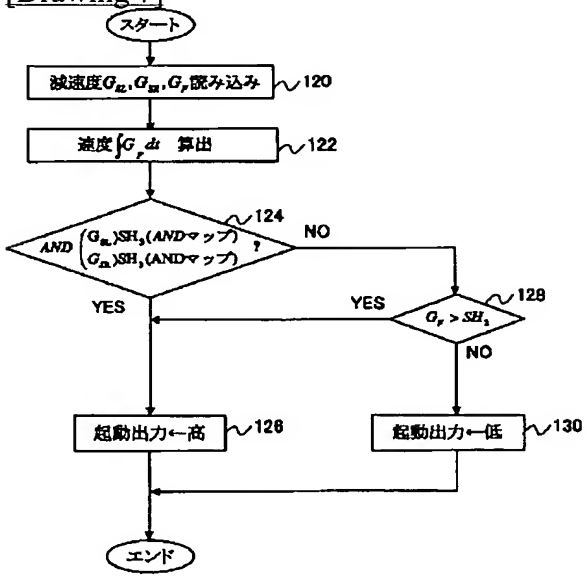
[Drawing 6]



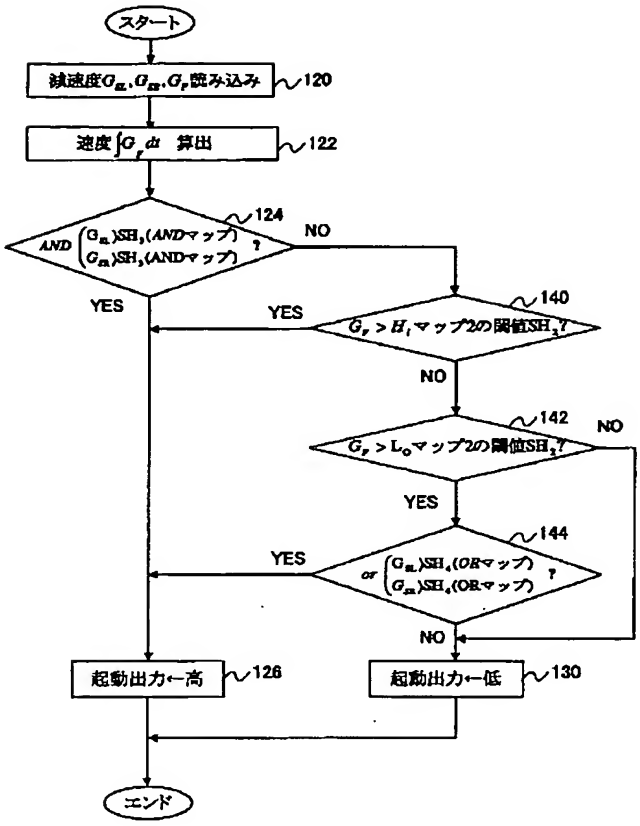
[Drawing 9]



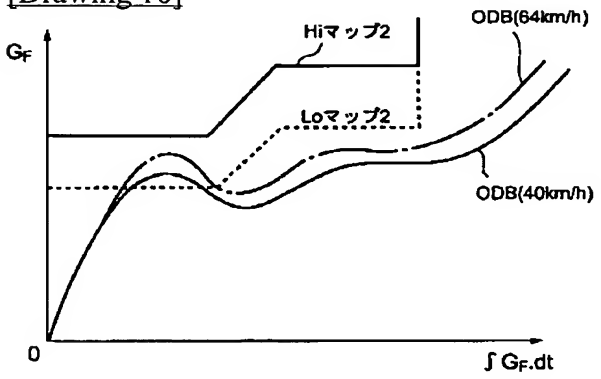
[Drawing 7]



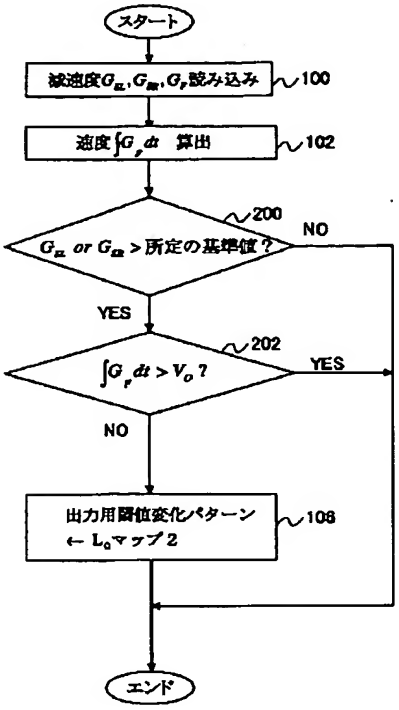
[Drawing 8]



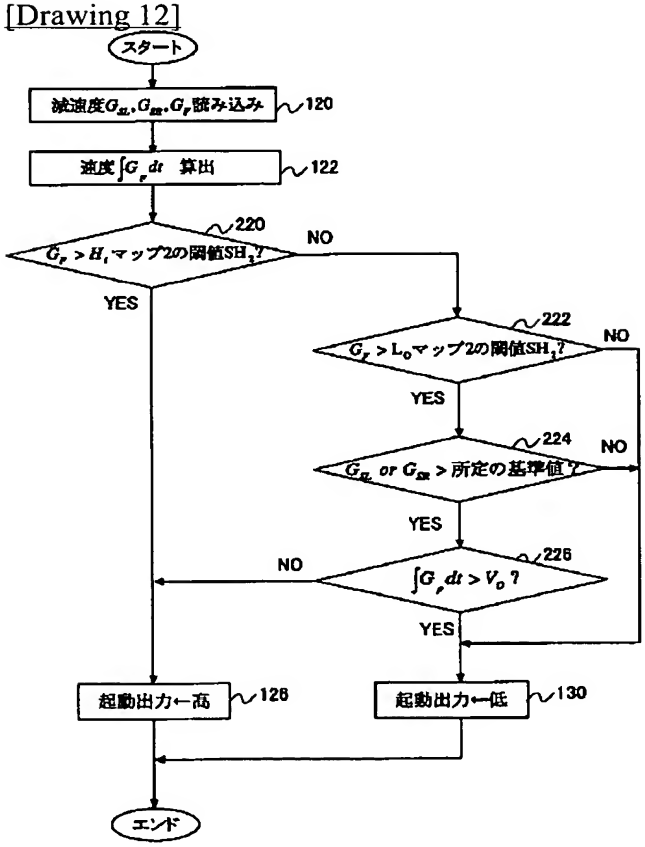
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]